REMARKS

The Office Action dated February 4, 2009, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

By this Response, claims 1-2 have been amended to more particularly point out and distinctly claim the subject matter of the present invention. Claim 14 has been cancelled without prejudice or disclaimer. No new matter has been added. Claims 8-11 were withdrawn from consideration in the Response dated March 21, 2008, in response to the Restriction Requirement dated February 22, 2008. Accordingly, claims 1-7 and 12-13 are currently pending in the application, of which claims 1-2 are independent claims. In view of the above amendments and the following remarks, Applicants respectfully request reconsideration and timely withdrawal of the pending rejections to the claims for the reasons discussed below.

Claim Rejections under 35 U.S.C. §112, Second Paragraph

The Office Action rejected claims 1-7 and 12-14 under 35 U.S.C. §112, second paragraph as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action alleged that the claims, as amended, fail to provide any method steps for the claimed method. Additionally, the Office Action alleged that the claims recite a method without reciting what the method is for. Further, the Office Action alleged that

no method step correlates with the preamble. Therefore, according to the Examiner, what Applicant requires for protection is unclear.

Accordingly, Applicants have amended claims 1-2 to more particularly point out and distinctly claim the subject matter of the invention, rendering the rejection of claims 1-2 under 35 U.S.C. §112, second paragraph, moot. In particular, claims 1-2, as amended, each recite a method for creating a new flower color, whereby each method provides steps for establishing or analyzing a genotype, selecting two flowering plants to be crossed, and introducing the genotype in the flavonoid biosynthesis to create the new color to create the new flower color.

Therefore, Applicants respectfully request withdrawal of the rejections of claims 1-7 and 12-14 under 35 U.S.C. §112, second paragraph, and respectfully submit that claims 1-2, and the claims that depend therefrom, are now in condition for allowance.

Claim Rejections under 35 U.S.C. §102(a)

The Office Action rejected claims 1, 3-4, and 6-7 under 35 U.S.C. §102(a) as allegedly anticipated by Uddin, *et al.* (Acta. Horticulturae., 2003, A Proceeding of the XXVI International Horticultural Congress, "Elegant Science in Floriculture," pp. 51-59) ("Uddin"). The Office Action alleged that Uddin discloses or suggests each and every claim element recited in claims 1, 3-4, and 6-7.

The Office Action further alleged that Uddin was publicly made available the week of August 11-17, 2002, at the XXVI International Horticultural Congress, Elegant

Science in Floriculture convention ("Convention"). Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in Uddin.

Claim 1, upon which claims 3-4, 6-7, and 13 depend, recites a method for creating a new flower color. The method includes establishing or analyzing a genotype $H^XH^X \cdot Pg/pg \cdot Cy/cy \cdot Dp/dp$ in a flavonoid biosynthesis for crossing flowering plants, and selecting two flowering plants to be crossed based on the established or analyzed genotype. The method further includes introducing the genotype in the flavonoid biosynthesis to create the new flower color. The genotype $H^XH^X \cdot Pg/pg \cdot Cy/cy \cdot Dp/dp$ is an inheritance of flower pigments, pelargonidin (Pgn), cyanidin (Cyn), and delphinidin (Dpn). Five multiple alleles, H^T, H^F, H^D, H^Z, and H^O control hydroxylation at 3'-position, hydroxylation at 5'-position, hydroxylation of 3',5'-positions, hydroxylation at 3'- and 5'-positions, and hydroxylation of 5'-, and 3',5'-position, respectively.

As will be discussed below, Uddin fails to disclose or suggest each and every element recited in claims 1, 3-4, and 6-7, and therefore fails to provide the features of the claims discussed above.

Uddin is directed to the production of new variants of flower color using four pigment genotypes, H^T, H^F, H^D, and H^O (*See Uddin*, Abstract, at least page 52: Determination of four Alleles H^T, H^F, H^D, and H^O).

Applicants respectfully submit that Uddin fails to disclose or suggest each and every element recited in claim 1. In particular, Uddin fails to disclose or suggest, at least, "wherein five multiple alleles, H^T, H^F, H^D, H^Z, and H^O control hydroxylation at 3'-

position, hydroxylation at 5'-position, hydroxylation of 3',5'-positions, hydroxylation at 3'- and 5'-positions, and hydroxylation of 5'-, and 3',5'-position, respectively," as recited in claim 1 (emphasis added).

Rather, Uddin describes the production of new variants of flower color for creating flowering plants by predicting flower colors on the basis of *four* pigment genotypes. Based on the genotypes described in Uddin, only 16 pattern combinations are possible. Whereas, claim 1 recites a method for creating a new flower color using *five* pigment genotypes, providing the possibility for 25 pattern combinations. Thus, Uddin fails to describe the fifth allele, H^Z. Accordingly, Uddin fails to disclose or suggest each and every element recited in claim 1.

Claims 3-4 and 6-7 depend from claim 1. Accordingly, claims 3-4 and 6-7 should be allowable for at least their dependency upon an allowable base claim, and for the specific limitations recited therein.

Therefore, Applicants respectfully request withdrawal of the rejections of claims 1, 3-4, and 6-7 under 35 U.S.C. §102(a) and respectfully submit that claim 1, and the claims that depend therefrom, are now in condition for allowance.

Claim Rejections under 35 U.S.C. §103(a)

The Office Action rejected claims 1-7 and 12-14 under 35 U.S.C. §103(a) as being allegedly unpatentable over Oud, *et al.* (Euphytica 84: 175-181, 1995) ("Oud") in view of van Raamsdonk (Genetic Resources and Crop Evolution 40: 49-54, 1993), and further in

view of Griesbach (J. Heredity 87(3): 241-245, 1996). Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in the combination of Oud, Raamsdonk, and Griesbach.

Claim 1, upon which claims 3-4, 6-7, and 13 depend, recites a method for creating a new flower color. The method includes establishing or analyzing a genotype $H^XH^X \cdot Pg/pg \cdot Cy/cy \cdot Dp/dp$ in a flavonoid biosynthesis for crossing flowering plants, and selecting two flowering plants to be crossed based on the established or analyzed genotype. The method further includes introducing the genotype in the flavonoid biosynthesis to create the new flower color. The genotype $H^XH^X \cdot Pg/pg \cdot Cy/cy \cdot Dp/dp$ is an inheritance of flower pigments, pelargonidin (Pgn), cyanidin (Cyn), and delphinidin (Dpn). Five multiple alleles, H^T, H^F, H^D, H^Z, and H^O control hydroxylation at 3'-position, hydroxylation at 5'-position, hydroxylation of 3',5'-positions, hydroxylation at 3'- and 5'-positions, and hydroxylation of 5'-, and 3',5'-position, respectively.

Claim 2, upon which claims 5 and 12 depend, recites a method for creating a new flower color. The method includes establishing or analyzing a genotype $D/d \cdot E/e \cdot H^XH^X \cdot Pg/pg \cdot Cy/cy \cdot Dp/dp$ in a flavonoid biosynthesis for crossing flowering plants. The method further includes selecting two flowering plants to be crossed based on the established or analyzed genotype, and introducing the genotype in the flavonoid biosynthesis to create the new flower color. The genotype $D/d \cdot E/e \cdot H^XH^X \cdot Pg/pg \cdot Cy/cy \cdot Dp/dp$ is an inheritance of flower pigments, pelargonidin

(Pgn), cyanidin (Cyn), and delphinidin (Dpn). Five multiple alleles, H^T, H^F, H^D, H^Z, and H^O control hydroxylation at 3'-position, hydroxylation at 5'-position, hydroxylation of 3',5'-positions, hydroxylation at 3'- and 5'-positions, and hydroxylation of 5'-, and 3',5'-position, respectively.

Applicants respectfully submit that certain embodiments of the invention provide non-obvious advantages. Certain embodiments of the invention relate to the combination of five multiple alleles, H^T, H^F, H^D, H^Z, and H^O, the genotype H^XH^X, and the phenotype Pg/pg·Cy/cy·Dp/dp to predict a new flower color from crossing flower plants.

As will be discussed below, the combination of Oud, Raamsdonk, and Greisbach would fail to disclose or suggest each and every element recited in claims 1-7 and 12-13, and therefore fails to provide the advantages and the features of the claims discussed above. Claim 14 has been cancelled without prejudice or disclaimer.

Oud is directed to breeding of transgenic orange *Pentunia hybrida* varieties. Oud relates to the contribution of flower color to the total ornamental value of a flower. Oud describes how the combination of biochemical knowledge and genetic engineering technology has resulted in the addition of a new color to the existing color range of *Petunia hybrida* (Oud, Abstract).

Raamsdonk is directed to a flower pigment composition in *Tulipa*. Raamsdonk analyzed flower pigment compositions of 43 accessions of *Tulipa* species, 6 species hybrids, and 494 tulip cultivars with respect to the amount of carotenoids, and the anthocyanidins, pelargonidin, cyanidin, and delphinidin (Raamsdonk, Abstract).

Griesbach is directed to the inheritance of flower color in *Petunia hybrida* vilm. Griesbach focuses on the inheritance of specific flower colors in *Petunia hybrida* through the combined inheritance of anthocyanin pigmentation and pH (Griesbach, Abstract).

Claims 3-4, 6-7, and 13 depend from claim 1. Claim 5 and 12 depend from claim 2. Accordingly, claims 3-7 and 12-13 should be allowable for at least their dependency upon an allowable base claim, and for the specific limitations recited therein. Claim 14 has been cancelled without prejudice or disclaimer.

Therefore, Applicants respectfully request withdrawal of the rejections of claims 1-7 and 12-14 under 35 U.S.C. §102(a) and respectfully submit that claims 1 and 2, and the claims that depend therefrom, are now in condition for allowance.

Assuming *arguendo* that the teachings of Oud could be combined with the teachings of Raamsdonk and the teachings of Griesbach, the combination of Oud, Raamsdonk, and Griesbach would fail to disclose or suggest, at least, "wherein five multiple alleles, H^T, H^F, H^D, H^Z, and H^O, control hydroxylation at 3'-position, hydroxylation at 5'-position, hydroxylation of 3',5'-positions, hydroxylation at 3'- and 5'-positions, and hydroxylation of 5'-, and 3',5'-position, respectively," as recited in proposed claim 1 (emphasis added), and similarly recited in claim 2.

Each of Oud, Raamsdonk, and Griesbach describe expression (biosynthesis) of an anthocyanidins pigment(s) utilizing a combination of independent dominant/recessive genes *according to Mendel's Law of Inheritance*.

One of ordinary skill in the relevant art would have understood that the concept of an anthocyanidin synthesis pathway utilizing a combination of independent dominant/recessive genes according to Mendel's Law of Inheritance, as described in Oud, Raamsdonk, and Griesbach, is completely different from a process utilizing multiple alleles, *i.e.*, 5 alleles, not in accordance with Mendel's Law of Inheritance, as provided in certain embodiments of the invention.

For example, Oud describes an anthocyanidin biosynthesis pathway using Ht/ht and Hf/hf genes. Ht/ht is a dominant/recessive gene which expresses a Cyanidin pigment. Hf/hf is a dominant/recessive gene which expresses a Cyanidin pigment and a Delphinidin pigment. These genes exist, but are not alleles. Oud fails to describe any contribution of genes. In fact, one of ordinary skill in the art would have concluded that there are some inconsistencies in the description in Oud between the actual results and the combination of genotypes.

For instance, the genotype AnAnhththfhfflfl showing a follower color of RL01 (see 4th line from the material) can be found on Table 2, 178). According to Table 2, cya (Cyanidin) and del (Delphinidin) are contained in small amounts. This is incompatible with the genotype hththfhf, which is a receive gene and which never express these pigments. It can be understand therefrom that it is difficulet to precisely predict the expressing anthocyanidin pigments utilizing the combination of independent dominant/recessive genes.

AnAnHtHthfhfflfl described in Oud has a possibility to express Pelargonidin and Delphinidin pigments at the same time. However, AnAnHtHthfhfflfl does not express Pelargonidin and Delphinidin pigments at the same time.

As described above, it is clear that anthocyanin biosynthesis pathway in Oud utilizing the combination of independent dominant/recessive genes is completely different from that utilizing the multiple alleles not accorded with Mendel's law of inheritance as in the claimed invention. Consequently, it is impossible to derive the anthocyanidin biosynthesis pathway of the claimed invention utilizing the multiple alleles from Oud's pathway only disclosed in the pathway utilizing the combination of the independent dominant/recessive genes.

Also, it can be considered that AnAnHtHthfhfflf which is the combination of genotype for expressing Pelargonidin, Cyanidin, and Delphinidin pigments at the same time, but such a combination has not yet been reported until now.

In other words, the genotype utilized in the claimed invention is characterized in the fact that the mechanism for expressing anthocyanidin which can be never expected from the combination of the independent dominant/recessive genes, and that it can precisely predict the expressing anthocyanidin pigments due to the combination of alleles.

Specifically, it is very difficult to find the anthocyanidin biosynthesis pathway of the claimed invention utilizing multiple alleles not accorded with Mendel's law of inheritance (dominance).

Accordingly, even if the prediction of flower color from the expressing anthocyanidins has been known, it is very difficult to derive the claimed invention from Oud which cannot predict expressing anthocyanidin pigments in a precision manner.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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Enclosure: Appendix A: Explanation by Inventor

APPENDIX A

Explanation by Inventor

Oud

There is no example which shows attribution of genotype concerning flower color based on the figure shown in p176. Only disclosed in Oud is *AnAnhththfhfflfl* a genotype showing a flower color of RL01 (the fourth line from Material right column of p176). The pigment composition is shown in Table 2 of p178. Showing the results, cya (Cyanidin) and del (Delphinidin) are contained in small amounts. This is incompatible with the genotype hththfhf, which is a receive gene and which never express these pigments. Oud does not demonstrate a specific reason why pel (Pelargonidin) is not expressed. Also, Oud does not disclose attribution of the genotype corresponding to the pigment of the flower color of the progeny (see Table 3 of p178).

From the information described above, the genotype "*Ht/ht*" described in Oud can be proven to be a dominant/recessive gene which expresses a Cyanidin pigment, and Hf/hf is a dominant/recessive gene which expresses a Cyanidin pigment and a Delphinidin pigment. These genes exist and are not allele. For instance, AnAnHtHthfhfflfl described in Oud has a possibility to express Pelargonidin and Delphinidin pigments at the same time. However, in the case of $H^{X}H^{X}Pg/pgCy/cyDp/dp$of our invention, AnAnHtHthfhfflfl does not express Pelargonidin and Delphinidin pigments at the same time. They are inconsistent with each other.

Even if the genotype which can express Pelargonidin, Cyanidin, and Delphinidin pigments at the same time can be deduced to be *AnAnHtHtHfHfflfl*, such a combination has not yet been reported until now, Oud does not know the existence of H^{O} which is one of our genotype.

Griesbach

Griesbach shows a scheme of pigment genotype utilizing dominant genotypes Hf and Mf concerning flower colors in p242. Table 1 shows concrete examples of attribution, and the explanation of the attribution can be seen from line 23 page 245 left column (paragraphs 1 to 4). According to Griesbach Ht/ht used therein is a dominant/recessive gene which expresses a Cyanidin pigment and a Delphinidin pigment. Mf/mf used therein is a dominant/recessive gene which controls methylation of hydroxyl group of the B ring of flavonoid. Specifically, Mf/mf is a dominant/recessive gene which biosynthesize Peonidin, and Petunidin, and Malvidin from Cyanidin and Delphinidin, respectively.

APPENDIX A

According to Table 1 of Griesbach, hfhfmfmf expresses Pelargonidin and Cyanidin pigment. Griesbach does not show the mechanism of expression of Pelargonidin and Cyanidin pigment. In contrast, according to claimed invention utilizing $H^XH^XPg/pgCy/cyDp/dp$, *the expression of* Pelargonidin and Cyanidin pigment can be clearly indicated as H^TH^TPg-*Cy*-. As described above, Griesbach does not know that the expression of the pigments by the genotype *hfhfmfmf* can be explained only by one genotype H^T.

According to Griesbach, the expression of pigments in case of the genotype *Hfhfmfmf* is Delphinidin pigment, and the pigment phenotype thereof expresses Pelargonidin, Cyanidin, and Delphinidin pigments at the same time. However, no explanation of the mechanism can be found therein. Only described is that Hf/hf is an independent dominant/recessive genes on page 245. Accordingly, Griesbach does not know the production of these three pigments can be explained by the existence of the genotype H^O of the present invention.

Raamsdonk

There is an explanation of the genotype from the eighth line from the bottom of left column of p53. According to the Raamsdonk, *-dfr/-Ht/-Hf* produces no anthocyanin (white flower), *-Ht/-Hf* produces Pelargonidin, and –Hf produces Pelargonidin and Cyanidin. However, no specific example of the pigment expression other than the above gene combinations is disclosed therein. Similar to Oud, three genotypes *-dfr/-Ht/-Hf* are independent. Specifically, *DFR/dfr* is a independent dominant/recessive genotype which controls anthocyanine biosynthesis gene. Ht/ht is a dominant/recessive gene which expresses a Cyanidin pigment. Hf/hf is a dominant/recessive gene which expresses a Delphinidin pigment.

For example, the genotype *-DFR-Ht-HF* has a possibility to express Pelargonidin, and Delphinidin pigments at the same time. However, in the case of $H^XH^XPg/pgCy/cyDp/dp$ of our invention, *-DFR-Ht-HF* does not express Pelargonidin and Delphinidin pigments at the same time. They are inconsistent with each other, making it possible to distinguish the present invention from Raamsdonk.

Even if the genotype which can be Pelargonidin, Cyanidin, and Delphinidin pigments at the same time can be deduced to be *DFRDFRHTHTHFHF*, such a combination has not yet been reported until now, Raamsdonk does not know the existence of H^O which is one of our genotype.